

FROZEN-THAWED BISON MEAT DISPLAY AND SHELF LIFE

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I. OBJECTIVES

The study objective was to determine the display life of previously frozen and then thawed bison retail ribeye steaks, sirloin steaks, stew meat, and ground bison.

II. MATERIALS AND METHODS

All Bison (*Bison bison*) retail products were received vacuum sealed, frozen, and in boxes from the same source. All whole muscle cuts were packaged and frozen on the same day, and all ground bison was packaged and frozen on the same day. Product was thawed at approximately 4°C and then placed on racks in a 4°C cooler still in its vacuumed package to simulate retail display under continuous fluorescent lighting. Product was moved on the shelf on average every 6 d. Three packages of each product type were evaluated on days 0, 7, 14, 21, 25, 32, 35, 39, 42, and 46 for aerobic plate counts (APC), objective color (L^* , a^* , b^*), and oxidation by thiobarbituric acid reactive substances (TBARS). A 5-cm × 5-cm area on each whole muscle cut was swabbed with an EZ-Reach Polyurethane Sponge Sampler saturated in a 10-mL Lethen broth and sent to a commercial lab for APC. A 25-g sample of ground bison was removed from its package, placed in a Whirlpak bag, and sent to the same lab for APC. After a 45-min bloom time, color scores were measured with a Minolta colorimeter using a D₆₅ illuminant in the center of steaks, in the center of the formed patty of ground, and in the center of stew meat formed into one solid sample. Samples for TBARS were ground, and 2-g subsamples were vacuum packaged and frozen at -80°C until analysis by the OxiSelect TBARS Assay Kit (Cell Biolabs STA-330). Data were analyzed using the Mixed Procedure of SAS (SAS Institute Inc., Cary, NC) within each cut with day as the fixed effect and replication as the random effect.

III. RESULTS

APC for ribeye, sirloin, and stew meat were greater ($P < 0.05$) at day 32 compared with those at earlier time points, with ground bison showing no increases over display days. Ground bison and sirloin had decreased ($P < 0.05$) L^* between day 21 and day 32. The a^* value was decreased between day 21 and day 32 for ground bison ($P < 0.1$), sirloin ($P < 0.05$), and stew meat ($P < 0.05$). Ground bison ($P < 0.1$), sirloin ($P < 0.1$), and stew meat ($P < 0.15$) tended to have decreased b^* between days 21 and 32. TBARS (μmol malondialdehyde/g protein) trended upwards from day 0 to day 46 in both ribeye and sirloin.

IV. CONCLUSION

Based on changes in objective color score, microbial growth measured by APC, and oxidation by TBARS, frozen-thawed bison ribeye steaks, sirloin steaks, and stew meat had a display life range of 21 to 32 d, whereas frozen-thawed ground bison had a display life range up to 32 d.

Keywords: bison, lipid oxidation, meat color, microbial growth, shelf life